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TROUT OF PENNSYLVANIA

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Trout of Pennsylvania

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At the present time there are four different species or kinds of trout found in the different waters of the State, namely, brook trout, brown trout, rainbow trout, and lake trout.

Of the four trouts, the brook trout is the only one that is a native of the inland waters of Pennsylvania. Brook trout were very abundant in streams and many of the lakes in Pennsylvania in the days of the early settler. This native fish of our state requires cold, clean water. The cutting of the timber, careless farm practices, and pollution caused by industries and other activities of man have made many waters now unsuitable for this beautiful gamey fish.

The brook trout spawn or lay their eggs in the fall of the year, generally during the latter part of October and the early part of November. At the approach of the spawning period the parent fish leave the main stream and enter the small, spring-fed tributary streams. Here the female fish digs a hole in a gravel bank in the bottom of the creek and deposits her eggs, which are then fertilized by the male fish. After the eggs are fertilized, the female proceeds to cover the eggs with gravel. Both parent fish linger about the home or nest for several days, then depart and leave the care of the eggs and young fish to Nature.

In the rapid development of our present high standard of living, we have destroyed much of our natural resources, including many kinds of fish and other forms of wild life. The cutting of the timber and other activities have dried up or destroyed most of the small spring-fed tributary streams that were the original nursery or incubator waters for the brook trout.

In the fall when these fish felt the urge to spawn, they sought the small, spring-fed tributaries because during the winter months when the eggs were hatching, the water kept a fairly uniform temperature somewhere between 40° and 50°F. This temperature was

Brook trout in a hatchery pond.

are naturally a fish of extremely cold, clean water. In 1883 a consignment of rainbow trout eggs taken from fish of the Pacific slope was shipped to the state fish hatchery at Donegal Springs, Pennsylvania. These eggs were hatched and the fry stocked in local streams in that vicinity. Since that time, various fish commissions and the United States Government have stocked many rainbow trout in the waters of eastern United States. In the beginning, most of these stockings met with failure. This was probably due to the fact that these fish could not survive the high temperatures of our present-day trout waters. As time went on, strains were developed at the various fish hatcheries in the eastern United States that eventually became acclimated to our conditions; and, at the present time, very favorable results are being obtained in stocking the so-called eastern domesticated rainbow trout.

The spawning habits of the rainbow trout in eastern United States are very similar to those of the brook and brown trout, excepting under natural conditions the rainbow trout spawn in the spring of the year and not in the fall. The fry of the rainbow trout that are hatched in the waters of Pennsylvania in the spring have little chance of surviving because of the high temperatures of our trout streams during the summer months and other conditions that are unfavorable for the growth and development of these young fish. At the state hatcheries, through the control of water temperatures and selective breeding, a brood stock has been produced that spawns in the fall of the year. But after these fish are introduced in the wild waters, they soon revert to spring spawning.

Very few of the Nature lovers or anglers of Pennsylvania are familiar with the lake trout. This fish prefers deep, cold, clean lakes and was originally a native of the Great Lakes drainage system. In the early days, it was very abundant in Lake Erie and was harvested in great numbers by the commercial fishermen and sold on the market as a delicacy. As the waters of Pennsylvania changed in direct proportion to the growth and development of industries and agriculture, the lake trout disappeared from all the inland waters of Pennsylvania with the exception of a few deep, clean lakes. Lake trout that inhabit these water areas spend their summers in the deep part of the lake where the water is cool. It is not uncommon when angling for lake trout in the summertime to fish at a depth of 30 to 40 feet.

These fish are fall spawners also. They seek shoals at a depth of 20 to 30 feet where they build their nests. After the young hatch, they scatter about in search of suitable food.

All of you who have studied the early history of the United States know that the early settlers established their homes on the banks of streams and rivers. When these early settlers made their homes by the waterside, they had a purpose in view. The animals that made their homes near the streams and rivers furnished fur for clothing and other purposes. The abundance of fish furnished a stable and abundant food supply, supplemented naturally by wild game and meager farm crops. The water sources also were their most dependable means of transportation. As the population increased, industries and cities grew, and agricultural methods developed, and other means of livelihood took over. Today the fish in our streams and the game in our forests are not looked upon as an important food supply. However, the love of the out-of-doors and the thrill of hunting and fishing have stayed with us; and these two recreations today are conceded to be as widespread as those of baseball or football.

The first advance in our mode of living that seriously affected the natural spawning and development of our trout was the cutting of the timber. This in turn dried up many tributary streams, raised the summer temperature in the water of the main streams to a dangerous point for trout, subjected the streams to floods, erosion, and the like. This was followed in many cases by pollution from industry and metropolitan districts and later followed by serious erosion conditions caused by industries and agricultural methods. As all of these things that were injurious to the aquatic life in our streams were taking place, the number of anglers or fishermen was constantly increasing. As early as 1876 those responsible for our fish-life foresaw that unless some action were taken to assist Nature and to conserve our fish-life, many species including the trout would practically disappear. Their first step in this conservation program was to enact laws governing the taking of fish and other legislation tending toward conserving the supply.

About this time it was found that because of the condition of the waters, Nature could not seed the streams with enough young fish to take care of the demand; and, in order to supplement the work of Nature, fish hatcheries were constructed where fish were hatched and the young planted in the streams. The first fish hatchery in Pennsylvania consisted of a small development constructed in 1873 at Donegal Springs near

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Marietta, Lancaster County, Pa. Since that time the growing of fish of different kinds for stocking the public fishing waters of the State has grown into a huge industry involving the expenditure of over a million dollars a year and consisting of ten large fish hatcheries scattered over the State. At the present time the moneys for the growing and protection of fish and the stocking of streams is derived from the sale of fishing licenses. Fishing licenses are a privilege tax because those who do not fish or do not choose to buy a license are making no financial contribution toward this work. In Pennsylvania today all matters pertaining to fish and fishing come under the jurisdiction of a State agency known as the Pennsylvania Board of Fish Commissioners, consisting of a Commissioner of Fisheries and seven other citizens known as Board members, which supervises the operations of the Fish Commission.

The term "fish hatchery" under present-day conditions is not what the name implies. In their early days they were just what the name means—fish hatcheries, because at that time the eggs were hatched at these plants and the baby fish stocked in the streams when they were but a few hours old. Present-day conditions are such that the stocking of small fish will no longer suffice and the trout are held and grown at the State Fish Hatcheries until they are of a legal size or larger and then stocked in the public fishing waters. The growing of a vast number of fish to a large size has brought about the development of the so-called fish hatcheries into huge fish farms. The crops of fish are handled and grown somewhat as livestock on the farm except that the Board of Fish Commissioners grow their crop of livestock in the water, which might be termed "aquaculture" or water farming.

A trout hatchery consists of a hatchery building where the trout eggs are hatched and the baby fish cared for during the first few weeks of their life. In addition to this, the property consists of a large number of ponds or pools used in holding the brood fish and the growing fish of different sizes and ages. You will recall that previously we mentioned that trout must have cold water that is not contaminated with any matter injurious to fish, which follows that water supply for the trout hatcheries is generally large natural springs that flow an abundance of clean water of a low, even temperature.

Naturally, any livestock breeder must give very careful attention to the brood stock or the animals that produce the young. At the state trout hatcheries great care is exercised in selecting the parent fish. They are chosen for their conformation, color, rate of growth, disease-resistance ability, and gaminess. These selected brood fish are held in large ponds year after year with the sole purpose of producing the all-important egg supplies. These brood fish consists of the brook trout, the brown trout, and the rainbow trout; the lake trout is not grown in the Pennsylvania hatcheries.

Extruding the milt of the male brown trout.

You will recall that it was stated before that all three kinds of trout at the Pennsylvania hatcheries spawn in the fall of the year. In early October or at the approach of the spawning period, the male and female fish are separated. This is done to prevent fighting among the male fish when the female fish are present at this time. Remember that the fertilization of all fish found in the native waters of Pennsylvania is external.

Not all female trout become ready to produce their eggs at the same time. Therefore, about every three days during the spawning period, the hatchery attendants

examine them to find out if they are ready to give forth their eggs. This is told by a sense of touch. If the abdominal walls of the female are soft and pliable, it is an indication that she is ready to spawn. A female that is ready to spawn is called a "ripe" fish. During the examination, all ripe fish, together with a number of male fish, are placed in large tanks of running water. When this sorting operation is completed, the eggs are squeezed artificially from the fish.

The female fish is grasped by the spawn-taker and a gentle pressure is exerted on the abdominal surface from the head toward the tail. This gentle pressure extrudes the eggs from the fish which are collected in a two-quart pudding pan. Immediately following this, a male fish is grasped in a similar manner and the milt or sperm is scattered over the freshly taken eggs. Thus fertilization takes place.

After the pan is full of eggs, they are gently transferred to the hatchery building and suspended on specially constructed wire trays in troughs of running water. The number of eggs that a female trout gives forth depends chiefly on her age and size, which might be anywhere from 400 to 4000 eggs. The brook trout under normal conditions reaches sexual maturity at 22 months of age; the brown and rainbow trout take about one year longer, generally at the age of 34 months.

The artificial taking of the eggs, if properly done, does not injure either parent fish in any way. The size of the egg varies somewhat in proportion to the size of the mother fish, but as a whole, trout eggs are somewhat larger than a BB shot.

The care of the egg during its hatching period consists of daily removal of dead or infertile eggs. These eggs when life no longer exists in them turn a pearl white. At intervals throughout the hatching period, the eggs are turned and their position is changed. This is done with the thought that the frequent change of position of the eggs produces a more vigorous fish. The hatching period of a trout again depends on the temperature of the water, ranging from 50 to 80 days. A trout egg is semi-transparent and as the eggs develop, the outline of the baby fish can plainly be seen within the shell. At the near approach of the hatching period, the entire fish can be observed moving within the covering of the egg.

When hatching time arrives, the little organisms break through the shell and fall through the specially constructed holding tray to the bottom of the hatching trough. The daily hatch is collected, carefully measured to get the percentage of hatch, and transferred to an adjoining trough of running spring water.

When the baby trout are first hatched, they take no food through the mouth. They have attached to the lower portion of their body an umbilical or yoke sac. At this early stage the baby fish is very helpless and spends most of his time lying on his side on the bottom of the trough. As the umbilical sac is gradually absorbed, the little fish gains in strength and begins to swim in search of food. The contents of the umbilical sac will fiurnish the nourishment for the baby fish from 15 to 30 days, depending again upon the temperature of the water. The colder the water, the longer it will take to absorb the food.

As soon as the yoke sac is entirely absorbed, the fish food for the baby trout consists of finely crushed liver. As they grow and develop, their liver diet is supplemented by about one-third ground marine fish.

The trout fry or baby fish are kept in the building in troughs of running water until they are taught to feed and until the weather warms up sufficiently in the spring to put them out-of-doors in larger nursery ponds. The care of the little fish while in the buildings consists of feeding and the exercise of careful sanitary measures to prevent the outbreak of disease. In other words, the sides and bottoms of the troughs are frequently scrubbed, and each day all uneaten particles of food and dead fish are removed. As a matter of fact, it is important that good sanitary practices be used in the management of the entire fish hatchery. The trout-grower has almost as many diseases with which to contend as the poultryman, and animals that live in the water are not as responsive to medical treatment as are higher forms of animal life; which follows that good sanitary measures are the best preventatives of disease outbreaks.

After the little fish are placed out-of-doors in the ponds to grow, it is found that certain individuals are much more aggressive and feed more readily than do others, which follows that in a short time in each pond there will be a number of different sizes of fish. Trout are cannibalistic and the larger ones do not hesitate to feed upon the smaller ones. In order to prevent this loss, the trout are handled and sorted into about three different sizes each year. Each time the fish are removed from the ponds for the sorting

Sorting brown trout to tell their condition as to ripeness just prior to the taking of the eggs.

process, the area is thoroughly cleaned and sterilized before a new crop of fish is placed in that pond.

Trout during the first year at the hatchery are fed three times a day; the older trout are fed once a day. The larger trout are given one-third liver and two-thirds marine fish. Trout are not unlike people for they must have a certain amount of different kinds of vitamins. Liver is essential as it appears to contain most of the food substances that the fish require. The selected brood stock get more choice food as they are fed about one-half liver and one-half marine fish. They apparently need the extra vitamins to produce a crop of fertile eggs.

These trout are held at the hatcheries until they are from seven to fourteen inches in length. You will recall that we mentioned elsewhere that trout vary in their rate of growth. Some individuals at a hatchery under favorable conditions will be eight to nine inches in twelve months; this is unusual. The average rate of growth is about seven inches in this same time. Therefore, it is necessary to hold many of the fish at the hatcheries eighteen months to two years before they are planted in the public fishing waters.

Because of the present poor condition of the streams for the holding of fish over winter, the majority of the trout are stocked in the spring of the year or just prior to the opening of the trout season. During the stocking period, the trout are removed from the ponds, counted, weighed, and left in the holding tanks for twenty-four hours in the hatcheries without food before they start on their journey to the streams. It may seem odd to think that a fish would get seasick but a trout starting on its journey to the streams in the huge tank trucks, if his stomach is full, becomes nauseated and contaminates the water. This contamination is injurious to all of the fish, and oftentimes results in a serious loss.

The fish are transported by motor truck in specially constructed transportation tanks. These tanks contain ice chambers which keep the temperature of the water uniform and low and they are also provided with pumps which keep the water in circulation, providing the necessary oxygen for their journey.

During the calendar year of 1947 the Pennsylvania Board of Fish Commissioners stocked from their different trout hatcheries 2,075,522 large trout, weighing over 305 tons. In order to produce this large tonnage of fish, it required 4,095,000 pounds of fish food.